

CATALOG OF THE ACANTHACEAE OF BELIZE WITH TAXONOMIC AND PHYTOGEOGRAPHIC NOTES

Thomas F. Daniel
Department of Botany
California Academy of Sciences
San Francisco, California 94118

INTRODUCTION

Belize is the second smallest country in Central America, with an area of about 23,000 square kilometers. It has the lowest population density in Central America with about 9 people per square kilometer (Famighetti 1995). The landscape comprises a low, often swampy Caribbean coastal plain, numerous cays, and a relatively low mountain range in the southern portion of the country. Approximately 3,200 species of flowering plants occur there (Spellman et al. 1975; Dwyer & Spellman 1981). The comprehensive *Flora of Guatemala* (Standley et al. 1958–1977) included Belize within its geographic scope, thus making it the best source of information for plants in this small nation.

Dwyer and Spellman's (1981) list of dicotyledonous plants in Belize provided the most recent account of Acanthaceae for the country. They listed 50 species of the family and cited collections for some of them. Daniel (1993) documented the occurrence in Belize of two species (*Carlowrightia myriantha* and *Justicia albo-bractea*) previously excluded or not known from the country. Daniel (1995b) subsequently noted the presence in Belize of several additional members of Acanthaceae (e.g., *Justicia candelariae* and *Ruellia hookeriana*), but did not document their occurrence by citing collections. Given the recent renewed interest in the botanical resources of Belize (e.g., the Flora Mesoamericana project; the New York Botanical Garden's project to produce a checklist of the flora of Belize), a verified account of the Acanthaceae in Belize is warranted.

In the following catalog, 47 species in 18 genera are documented from Belize, some for the first time. These comprise 40 native species and seven introduced species. Native Belizean Acanthaceae (Appendix) can be classified according to their overall distributions as widespread (i.e., occurring over a broader area than defined below), regional (i.e., restricted to the region from the Isthmus of Tehuantepec in southern Mexico eastward through Guatemala, Belize, and the Yucatan Peninsula to the lowlands of northwestern Honduras), local (i.e., restricted to Belize and adjacent regions of Guatemala, Honduras, and/or the Yucatan Peninsula of Mexico), and endemic (i.e., restricted to Belize). The appendix shows that the greatest proportion of native species are widespread. Indeed, for the Belizean flora as a whole, Lundell (1945) had noted that the majority of the species there are widely distributed ones of the West Indies and the Caribbean slope of Mexico and Central America. A sizable percentage of Belizean Acanthaceae (30% of the native species) is regional in distribution, that is, restricted to the northern Mesoamerican region. If this region were extended slightly to include some of the moist to wet forests encountered further to the north in Veracruz, at least one additional species here treated as widespread (i.e., *Dicliptera sumichrastii*) would be added

to this category. A single species of Acanthaceae, *Louteridium chartaceum*, is endemic to Belize. This species was discussed by Daniel (1993) who, at that time, noted three other endemic Acanthaceae in Belize. Each of the other three was subsequently (Daniel 1995b) treated as also occurring outside of the country. The percentage of endemic Acanthaceae with respect to all Belizean members of the family (i.e., native and introduced) is 2%. This percentage is considerably lower than the estimate of 4.6–6% endemism provided by Hampshire (1989) for the Belizean flora as a whole. The percentage of endemism among Belizean Acanthaceae is also much lower than that found among Acanthaceae in nearby larger regions with considerably greater diversities of climate and habitat, e.g., Guatemala (10%, i.e., 13 endemics/128 species; totals based on Gibson, 1974, with corrections in Daniel, 1995b, and various geographic updates) and Chiapas, Mexico (11%, i.e., 15 endemics/131 species; based on Daniel, 1995b). For more meaningful phytogeographic data, particularly regarding endemism, Belize should be regarded as part of a greater Yucatan region or divided into northern/drier and southern/moister regions that could be treated along with adjacent portions of environmentally similar surrounding regions of Mexico and Guatemala (cf. Wendt 1993: 596).

Collections have been made of at least seven species of Acanthaceae (*Andrographis gangetica*, *Hemigraphis alternata*, *Ruellia coerulea*, *Thunbergia alata*, *T. erecta*, *T. fragrans*, *T. grandiflora*) that have been introduced into Belize from other parts of the world. These exotics include cultivated and/or naturalized species. Additional non-native Acanthaceae almost certainly are cultivated in the country.

Within the country, the greatest concentrations of species of Acanthaceae are found in the southern three districts (Fig 1). This is likely due to the diversity of habitats created in southern Belize by the Maya Mountains and the presence of tropical rain forest there. In spite of the greater diversity of species in the south, particularly species associated with moist to wet forests (e.g., *Aphelandra aurantiaca*, *Bravaisia grandiflora*, *Justicia albobracteata*, *J. aurea*, *J. fimbriata*, *Louteridium donnell-smithii*, and *Mendoncia* spp.), the acanthaceous flora of Belize is enriched, particularly in Corozal, by “dry forest species” or species that are more common in the northern portion of the Yucatan peninsula (e.g., *Bravaisia berlandieriana*, *Carlowrightia myriantha*, and *Justicia campechiana*).

Spellman et al. (1975) remarked on the West Indian floristic influence in Belize. There are no Acanthaceae known from the West Indies that occur on the American continent only in Belize. Although 10 of the 40 (25%) native Acanthaceae of Belize also occur in the West Indies, all ten are widely distributed species, and none could be considered as primarily West Indian in distribution. Interestingly, no Acanthaceae have been reported from any of the numerous small islands (cays) off Belize (Fosberg et al. 1982).

For each species included in the following annotated catalog, the district(s) of occurrence and one or more collections that I have examined and identified are cited in order to voucher the occurrences and to provide a general indication of distribution within the country. Identification keys to most of these species can be found in the floristic accounts of Gibson (1974) for Guatemala and Daniel (1995b) for Chiapas, Mexico. Distinguishing features of species not treated in those accounts are provided herein. Because many Acanthaceae thrive in disturbed habitats and because portions of Belize remain inadequately collected, it seems likely that additional members of the family will be found in the country. Based on their overall distributions and the likelihood of appropriate habitats in the

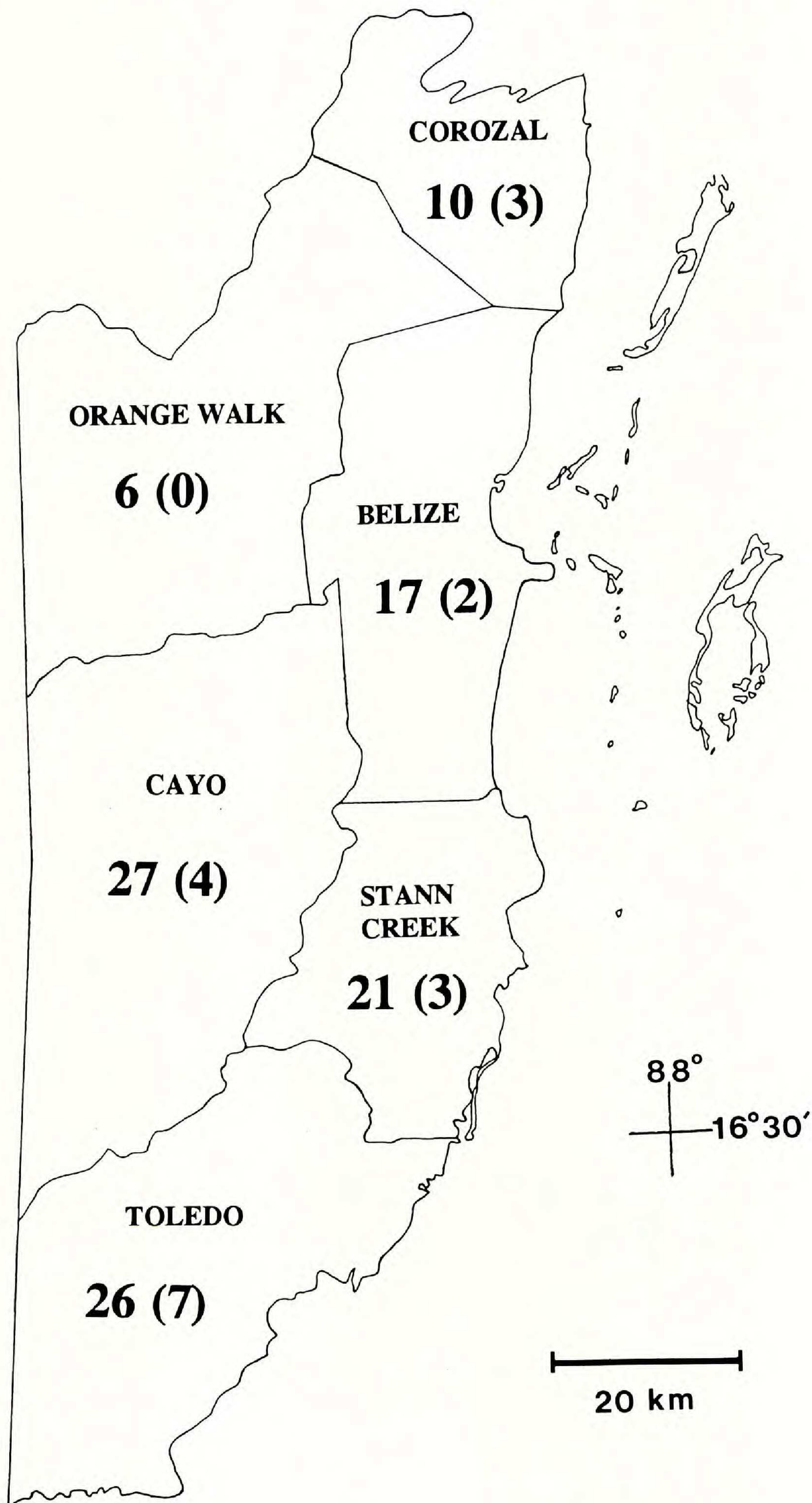


FIG. 1. Map of Belize showing political districts. Numbers indicate number of species of Acanthaceae in each district (and number of species of Belizean Acanthaceae known only from that district).

country, the following species might be expected to occur in Belize: *Elytraria bromoides* Oerst., *Justicia carthagenensis* Jacq., *J. colorifera* V.A.W. Graham, *Pseuderanthemum alatum* (Nees) Radlk., *P. cuspidatum* (Nees) Radlk., *Ruellia inundata* Kunth, *R. paniculata* L., *Stenandrium dulce* (Cav.) Nees, *S. pedunculatum* (Donn. Sm.) Leonard, and *S. subcordatum* Standl.

CATALOG OF THE ACANTHACEAE OF BELIZE

Aphelandra aurantiaca Lindl. (including *A. repanda* Nees).

CAYO: *Schipp* 625 (F).—TOLEDO: *Daniel & Butterwick* 5890 (CAS); *Gentle* 4288 (MICH), 7176 (MO, US); *Schipp* 1063 (F, MICH, MO, NY, UC).

The author of *A. aurantiaca* is usually cited as "(Scheidw.) Lindl." (e.g., Gibson 1974; Wasshausen 1975; Durkee 1978, 1986; Dwyer & Spellman 1981; Daniel 1991, 1995b). As pointed out to me by Mike Grayum in a letter, *Hemisandra aurantiaca* Scheidw. is a heterotypic synonym of, rather than the basionym of, *A. aurantiaca* Lindl. for the following reason. In 1842, Scheidweiler published *Hemisandra aurantiaca*. In Lindley's publication of *A. aurantiaca* in 1845, he cited the synonym "Hesemasandra aurantiaca, Hort." He further noted (Lindley 1845) that plants with this name had been exhibited at a horticultural meeting, but that the name was "not to be found in any Botanical books in our possession." Although it is very likely that the origin of Lindley's synonym (i.e., the horticultural *nomen novum*) was somehow derived from Scheidweiler's name, Lindley was clearly unaware of Scheidweiler's publication and, indeed, utilized a different generic spelling for the name he cited. Thus, Scheidweiler and Lindley described the same species, utilizing the same epithet, in different genera based on different specimens. Scheidweiler's name is older, but, if transferred to *Aphelandra*, becomes a later homonym of *A. aurantiaca* Lindl.

The name *A. repanda* applies to a sporadic form of *A. aurantiaca* with narrow, sinuately margined leaves (see Daniel, 1991: 251).

Aphelandra scabra (Vahl) Sm. (as *A. deppeana* Schldl. & Cham. in Dwyer & Spellman, 1981).

BELIZE: *Croat* 23905 (F, NY, US); *Gentle* 1185 (DS, F, MICH, NY, US), 1304 (F, MICH, NY); *McDaniel & Clark* 14348 (F); *Worthington* 23942 (RSA).—CAYO: *Arrigo* 5 (F); *Bartlett* 11884 (MICH), 11942 (MICH, US), 11947 (MICH, US); *Chanek* 38 (MICH, US); *Gentle* 2392 (MICH, NY), 8889 (CAS, F, US); *Lundell* 439 (CAS, F, US); *Meave* 1025 (MO); *Meave & Howe* 1164 (MO).—COROZAL: *Crane* 506 (CAS); *Gentle* 202 (MICH, US); *Kinloch* 3 (F).—ORANGE WALK: *Lundell* 504 (DS, F, NY, US); *Karling* 12 (F), 51 (F).—STANN CREEK: *Daniel & Butterwick* 5877 (CAS); *Molina R.* 18 (F); *Schipp* 37 (F, MICH, NY, UC, US).—TOLEDO: *Gentle* 3774 (MICH, NY, US), 3775 (F, MICH, NY, US); *Whitefoord* 1488 (MO), 1493 (MO), 1811 (MO).—DISTRICT UNKNOWN: *Bartlett* 11349 (MICH); *Stocker* 13 (F).

Asystasia gangetica (L.) Anders.

STANN CREEK: *Gentle* 7866 (F, US).

This Old World species has not been heretofore reported from Belize. It is cultivated and has become naturalized in various parts of tropical America (e.g., Costa Rica and Panama). The genus is not included in the treatments of Acan-

thaceae for Guatemala (Gibson 1974) or Chiapas (Daniel 1995b). It may be distinguished from all other Acanthaceae occurring in Belize by the combination of its herbaceous habit, infundibular corolla, four didynamous stamens with 2-the-cous anthers, and four or fewer seeds lacking hygrosopic trichomes.

Barleria oenotheroides Dum. Cours. (as *B. micans* Nees in Dwyer & Spellman 1981).

CAYO: *Balick et al.* 1990 (US); *Bartlett* 11478 (CAS, MICH, US).

The taxonomy and distribution of this species were discussed by Daniel (1995a).

Blechnum pyramidatum (Lam.) Urb. (as *B. brownei* Juss. in Dwyer & Spellman 1981).

BELIZE: *Dieckman* 187 (MO); *Liesner & Dwyer* 1441 (MO); *Lundell* 4212 (MICH).—CAYO: *Croat* 23701 (MO); *Daniel & Butterwick* 5876 (CAS); *Dwyer et al.* 65 (MO); *Lundell* 4154 (F, MICH); *Utley* 803 (F, MO, NY).—COROZAL: *Daniel* 8270 (CAS).—ORANGE WALK: *Daniel* 7015 (CAS), 8256 (CAS); *Egler* 42-95 (F); *Lundell* 24 (F, US).—STANN CREEK: *Daniel & Butterwick* 5881 (CAS); *Schipp* S-134 (F), 875 (F, MICH, MO, NY, UC).—TOLEDO: *Croat* 24117 (F, MO); *Whitefoord* 1549 (MO).

The correct name for this species was discussed by Daniel (1995a).

Bravaisia berlandieriana (Nees) T. F. Daniel (as *B. tubiflora* Hemsl. in Dwyer & Spellman 1981).

BELIZE: *Gentle* 1193 (A, BM, F, G, GH, K, LL, MICH, MO, NY, US); *McDaniel* 13080 (MO).—COROZAL: *Balick et al.* 3306 (US); *Crane* 47 (LL), 321 (LL); *Daniel* 8265 (BR, C, CAS, ENCB, K, MEXU, MICH, MO, NY, US); *Davidse & Brant* 32596 (CAS); *Gentle* 380 (CAS, F, MICH, US); *Stevenson* 1 (F).—ORANGE WALK: *Arnason & Lambert* 17152 (MO); *Daniel* 8263 (CAS); *Winzerling* VIII-14 (US).—DISTRICT UNKNOWN: *Campbell* 1 (K); *Stevenson* s.n. (US).

A monograph of this genus was provided by Daniel (1988).

Bravaisia grandiflora Donn. Sm.

TOLEDO: *Gentle* 4555 (LL, MO); *Lamb* 58 (F); *Peck* 730 (GH; type of *B. proxima* S. F. Blake); *Schipp* 1259 (A, BM, F, G, GH, MICH, MO, NY); *Whitefoord* 3219 (BM, MEXU, MO, NO).

Carlowrightia myriantha (Standl.) Standl.

COROZAL: *Crane* 516 (LL, MO); *Daniel* 8267 (BR, C, CAS, ENCB, F, K, MEXU, MICH, MO, NY, US), 8268 (CAS).

This species, reported from Belize by Daniel (1993), was not treated by Gibson (1974) or Daniel (1995b). It differs from other Belizean Acanthaceae by the combination of its stenotribal flowers; white to pink corollas 9–12 mm long with the upper lip lacking a rugula and having maroon lines within; two fertile stamens with ditheous anthers; parallel and more or less evenly inserted thecae lacking basal appendages; lack of staminodes; and glabrous, lenticular seeds 2–3 mm long that have entire margins.

Recent field observations reveal that this rarely collected species is common in the seasonal evergreen forests of Corozal, where it flowers during the dry season (e.g., March–April).

Dicliptera inutilis Leonard.

COROZAL: *Ramamoorthy et al.* 2735 (MEXU).

Among taxa in Mexico and Central America, this collection most closely resembles *D. inutilis*. It has relatively long (4 cm), apparently pinkish corollas and large (15–20 × 11–18 mm), broadly ovate to broadly trullate, and abaxially glabrous outer cymule bracteoles. The notation on the specimen label that the plant was a tree four to five meters in height is probably erroneous; trees are unknown in the genus. This is the first report of the species in Belize.

Dicliptera sexangularis (L.) Juss. (as *D. assurgens* (L.) Juss. in Dwyer & Spellman 1981).

BELIZE: *Daniel & Butterwick* 5901 (CAS); *Gentle* 1119 (F, MO, NY); *Peck* 351 (GH, NY).—CAYO: *Daniel & Butterwick* 5899 (CAS), 5900 (CAS); *Gentle* 9062 (CAS, F, MO, US), 9698 (CAS, F, MO, NY, US); *Lundell* 4101 (MICH, US), 4102 (MICH, US), 4103 (MICH, US); *McDaniel* 13070 (MO).—COROZAL: *Daniel* 8271 (CAS); *Pelly* 24 (F).—ORANGE WALK: *Arnason & Lambert* 1727 (MO); *Daniel* 7040 (CAS), 8215 (BR, C, CAS, K, MEXU, MICH, MO, NY, US).—STANN CREEK: *Gentle* 7882 (CAS, F, MO, US).

Dicliptera sumichrastii Lindau.

TOLEDO: *Schipp* S-684 (F, MO, NY).

The specimen at F was annotated by Leonard as *D. acuminata* (Ruiz & Pav.) Juss. and was so treated by him (Leonard 1936). Subsequently, Gibson annotated the same specimen as "*D. sumichrasti*?" and likewise treated it (Gibson 1974). Various species and complexes of species of North American *Dicliptera* remain to be adequately circumscribed. The collection cited above appears to represent a taxon closely related to, if not conspecific with, *D. sumichrastii*.

Elytraria imbricata (Vahl) Pers.

CAYO: *Bartlett* 11497 (MICH).

Hemigraphis alternata (Burm. f.) Anders.

BELIZE: *Bartlett* 11355 (MICH; type of *Blechum cordatum* Leonard).

This native of tropical Asia is naturalized in parts of tropical America.

Hygrophila costata Nees (as *H. guianensis* Nees in Dwyer & Spellman 1981).

CAYO: *Croat* 24852 (MO); *Dwyer & Dieckman* 13012 (CAS); *Dwyer & Liesner* 12059 (MO).—STANN CREEK: *Daniel & Butterwick* 5884 (CAS); *Dwyer et al.* 508 (F); *Gentle* 8627 (CAS, F, MO, US); *McDaniel* 12999 (MO).—TOLEDO: *Peck* 759 (GH); *Schipp* 1109 (F, MICH, MO, NY, UC).

Justicia albobractea Leonard.

Toledo: *Proctor* 36627 (F); *Schipp* 1277 (F; type).

This species was not listed by Dwyer and Spellman (1981), nor was it treated by Gibson (1974) for lack of flowering material. The species was fully described by Daniel (1993). It differs from other species of *Justicia* in Belize by the combination of its inflorescence of axillary pedunculate spikes to 65 mm long, ovate to elliptic bracts 8.5–16 mm long and 4.5–9.5 mm wide, 5-lobed calyces, corollas 29–31 mm long, superposed and parallel thecae 1.6–2 mm long (the lower with a basal appendage 0.5 mm long), and 3-aperturate pollen.

***Justicia aurea* Schltl.**

CAYO: *Bartlett 12937* (CAS, MICH, US).—TOLEDO: *Daniel & Butterwick 5889* (CAS); *Schipp S-601* (F, MO, NY).

***Justicia bartlettii* (Leonard) D. N. Gibson (including *J. pilifera* D. N. Gibson).**

BELIZE: *Liesner & Dwyer 1486* (MO).—CAYO: *Arvigo & Shropshire 203* (MO, US); *Bartlett 11477* (US; type of *Beloperone bartlettii* Leonard).—TOLEDO: *Davidse & Brant 32157* (CAS).

***Justicia breviflora* (Nees) Rusby (including *Pseuderanthemum tetrasepalum* (S. F. Blake) S. F. Blake).**

BELIZE: *Daniel 8296* (CAS).—CAYO: *Arvigo et al. 101* (US); *Bartlett 11948* (TEX, US), *12017a* (MICH), *13096* (MICH); *Cowan et al. 5149* (CAS), *5169* (CAS); *Daniel 8273* (CAS, K, MICH); *Gentle 2207* (MICH, NY), *2209* (F, MO, MICH, NY, RSA), *9077* (CAS, F, MO, US), *9645* (F, MO), *9687* (F, MO, US); *Lundell 6124* (MICH, NY, RSA, US), *6209* (MICH, US), *6290* (F, MICH, NY, US).—STANN CREEK: *Long 3290* (CAS, MO); *Molina R. 331* (F); *Schipp 542* (F, MICH, MO, NY, UC).—TOLEDO: *Cosentino 86* (F); *Croat 24317* (F, NY, RSA, US); *Daniel & Butterwick 5895* (CAS); *Gentle 4507* (MICH), *5274* (MO, US); *Holst 4025* (CAS), *4245* (CAS); *McDaniel 12884* (F, MO); *Peck 552* (GH; type of *Eranthemum tetrasepalum* S. F. Blake); *Peck 722* (GH; type of *Dianthera peckii* S. F. Blake); *Schipp S-473* (F).

Some of the morphological variation exhibited by this species in southern Mexico and northern Central America was discussed by Daniel (1995b). *Pseuderanthemum tetrasepalum* is herewith included in the synonymy of this species for the first time. In the protologue of *P. tetrasepalum*, Blake (1917) described the corollas as about 2.4 cm long and noted the presence of staminodes. Both of these features are more suggestive of *Pseuderanthemum* than *Justicia*. In a packet on the type, there are flowers of two taxa. Two of these flowers match Blake's description in length of the corolla and presence of staminodes. These flowers indeed belong to a species of *Pseuderanthemum*. The plant mounted on the sheet and the other, smaller flowers in the packet (with anthers pubescent and with thecae superposed) pertain to *J. breviflora* and correspond to the remainder of Blake's description. Four-parted calyces are not known in *Pseuderanthemum* but are often present in *J. breviflora* (Daniel 1995b). Pollen from the mounted specimen and from one of the small flowers in the packet on the type of *P. tetrasepalum* (i.e., 2-porate with a row of insulae on either side of each aperture) also resembles that of other specimens referred to *J. breviflora*. The description in Blake's protologue was thus derived from species of two genera. In accordance with Article 9.9 of the International Code of Botanical Nomenclature (Greuter et al. 1994), a lectotype for *J. breviflora* is herewith designated as that portion of *Peck 552* mounted on the sheet and the flowers in the packet with the anthers pubescent and the thecae superposed only, thereby excluding the two flowers of *Pseuderanthemum* also in the packet.

Justicia campechiana Standl.

COROZAL: *Castillo 44* (F); *Pelly 3* (F).

Justicia candelariae (Oerst.) Leonard.

CAYO: *Gentle 9011* (F, MO, US).—STANN CREEK: *Gentle 9316* (CAS, F, MO, US).

This species was not listed for Belize by Dwyer and Spellman (1981) but was noted to occur in the country by Daniel (1995b).

Justicia comata (L.) Lam.

BELIZE: *Gentle 913* (F, NY); *Lundell 1957* (MICH, US); *Whitefoord 2354* (MO).—CAYO: *Lundell 4151* (F, MICH); *Contreras 7145* (F, MO, US).—STANN CREEK: *Dwyer et al. 504* (MO); *Schipp 622* (F, MICH, MO, NY, UC).—DISTRICT UNKNOWN: *Usher 7* (MICH).

Justicia ensiflora (Standl.) D. N. Gibson.

STANN CREEK: *Gentle 2115* (DS, F, MICH, NY, US); *Gentry 7931* (MO); *Schipp 354* (F; type of *Jacobinia ensiflora* Standl.).

Justicia fimbriata (Nees) V. A. W. Graham (as *J. magniflora* (S. F. Blake) D. N. Gibson in Dwyer & Spellman 1981).

TOLEDO: *Balick et al. 2538* (US); *Cosentino 90* (F); *Daniel & Butterwick 5893* (CAS, MICH); *Davidse & Brant 32153* (CAS); *Gentle 5060* (MO, US); *Peck 622a* (GH; type of *Dicliptera magniflora* S. F. Blake); *Schipp S-694* (F; type of *Beloperone crenata* Standl.); *Stevenson 82* (F, NY, US).

Justicia pectoralis Jacq.

BELIZE: *Gentle 1530* (MICH, US).—STANN CREEK: *Daniel & Butterwick 5880* (CAS); *Gentle 1893* (MICH, NY, US).—TOLEDO: *Gentle 4419* (MICH), *5278* (MO, US), *7591* (MO); *Peck 979* (GH); *Proctor 36011* (MO).

Justicia spicigera Schlttdl.

BELIZE: *Peck 430* (GH; type of *Jacobinia scarlatina* S. F. Blake).—CAYO: *Chanek 40* (MICH, US).—ORANGE WALK: *Winzerling VIII-10* (F, US).—STANN CREEK: *Gentle 3305* (A, MICH, MO, NY, US); *Schipp 523* (A, F, GH, MICH, MO, NY, UC).—TOLEDO: *Gentle 7334* (CAS, F, MO, US); *Télliez et al. 5698* (F, GH).

Daniel (1995b) discussed the distinctions between this species and the similar *J. colorifera*, both of which are cultivated for use as a bluing agent in laundering fabric in Central America (Williams 1981).

Lepidagathis alopecuroidea (Vahl) R. Br. ex Griseb. (as *Teliostachya alopecuroidea* (Vahl) Nees in Dwyer & Spellman 1981).

CAYO: *Bartlett 11754* (MICH, NY, US), *13024* (CAS, MICH, US).—STANN CREEK: *Daniel & Butterwick 5879* (CAS); *Schipp S-135* (F).—TOLEDO: *Schipp 1342* (F, MICH, MO, NY).

The generic placement of this species was discussed by Daniel (1995a).

Louteridium chartaceum Leonard.

BELIZE: *Daniel 8294* (BR, CAS, MEXU, MICH, MO, US); *Daniel & Butterwick 5905* (C, CAS, K, MICH, MO, NY); *Dwyer 10959* (LL, MO); *Gentle 1526* (US; type); *Liesner & Dwyer 1485* (BM, DUKE, MO, NY, TEX).

Daniel (1993) noted that this endemic species was known from a single locality that was threatened with destruction. Indeed, quarrying activities have since destroyed the population at the site (at or near the type locality) from which *Daniel & Butterwick 5905* was collected. However, other populations have recently been located on several of the isolated limestone hills in the southern portion of Belize District (e.g., *Daniel 8294*). These hills persist as islands of relatively undisturbed vegetation among settlements and cultivated lands.

Louteridium donnell-smithii S. Watson.

CAYO: *Dwyer & Liesner 12313* (MO, NY); *Dwyer et al. 360* (MEXU, MO); *Gentry 7791* (MO).—TOLEDO: *Daniel & Butterwick 5891* (CAS); *Davidse & Brant 32089* (CAS, US), *32300* (CAS); *Gentle 6355* (MO, UC, US); *Holst 4045* (CAS); *Peck 780* (GH, NY); *Proctor 36148* (MO); *Schipp 1110* (MICH, MO, NY, UC).

Mendoncia lindavii Rusby.

STANN CREEK: *Gentle 3344* (F, MICH, MO, NY), *3523* (MICH, MO, NY, US); *Schipp 961* (F; type of *M. belizensis* Standl.).

Mendoncia retusa Turrill.

STANN CREEK: *Gentle 3472* (MICH, MO, NY).—TOLEDO: *Gentle 4218* (MICH), *6317* (CAS, F, MO, US); *Schipp 1051* (F, MICH, MO, NY, UC).—DISTRICT UNKNOWN: *Gentle 3981* (F, MICH, MO, NY).

Odontonema albiflorum Leonard.

CAYO: *Bartlett 13065* (CAS, MICH, US); *Gentle 2440* (A, F, K, LL, MICH, NY).—STANN CREEK: *Schipp S-278* (A, F, G, GH, K, MICH, MO, NY, UC).—TOLEDO: *Balick et al. 2547* (US); *Croat 24383* (F, MO); *Gentle 6567* (MO); *Peck 786* (GH, NY), *787* (GH, NY); *Proctor 35876* (MO); *Whitefoord 1615* (MO).

Odontonema callistachyum (Schltdl. & Cham.) Kuntze.

CAYO: *Dwyer & Dieckman 13014* (CAS); *Gentle 2441* (MICH), *8724* (CAS, F, MO, US).—STANN CREEK: *Croat 24523* (F, MO); *Daniel & Butterwick 5878* (CAS), *5882* (CAS), *5887* (CAS); *Gentle 2142* (MICH), *3501* (A, F, MICH, NY), *8202* (F, MO, US), *9250* (CAS, F, MO, US).—TOLEDO: *Croat 24312* (MO); *Daniel & Butterwick 5894* (CAS); *Davidse & Brant 32067* (CAS).

This species was treated as a heterogeneous complex by Gibson (1974). Discussion of this and the other species of *Odontonema* noted here can be found in Daniel (1995c).

Odontonema hondurense (Lindau) D. N. Gibson.

BELIZE: *Daniel 8295* (CAS, MICH, MO, US); *Liesner & Dwyer 1462* (MO); *Peck 278* (GH; type of *O. paniculiferum* S. F. Blake).—CAYO: *Bartlett 11442* (MICH, US), *12947* (MICH, US); *Gentle 2336*

(MICH, NY), 8835 (CAS, F, MO, US), 9004 (CAS, F, MO).—STANN CREEK: *Dwyer et al.* 571 (MO, US); *Gentle* 2136 (A, DS, F, K, LL, MICH, NY, US), 2158 (MICH), 2742 (MICH), 2793 (MICH, NY, US), 3195 (MICH), 3496 (F, MICH, NY); *Molina R.* 276 (F); *Schipp* 222 (A, BM, F, G, GH, MICH, NY, UC, US).—TOLEDO: *Daniel & Butterwick* 5892 (CAS, MICH); *Davidse & Brant* 31921 (CAS); *Gentle* 4506 (LL, MICH, MO), 6704 (F, MO, US); *Holst* 3873 (CAS); *Proctor* 35928 (MO); *Whitefoord* 1565 (CAS).

Odontonema tubaeforme (Bertol.) Kuntze (as *O. flagellum* (Oerst.) Kuntze in Dwyer & Spellman, 1981, and including *O. amicorum* V. M. Baum).

BELIZE: *Daniel* 8276 (CAS, MICH); *Daniel & Butterwick* 5904 (CAS); *Gentle* 1538 (GH, LL, MICH, MO, US); *Liesner & Dwyer* 1466 (MO); *Peck* 394 (GH, NY).—CAYO: *Bartlett* 11942a (MICH), 11952 (CAS, MICH, US); *Chanek* 41 (MICH, US); *Daniel & Butterwick* 5897 (CAS); *Dwyer et al.* 178 (MO); *Gentle* 2371 (F, NY), 2439 (MICH); *Spellman* 1430 (MO).—STANN CREEK: *Schipp* 146 (F, NY, UC, US).—TOLEDO: *Croat* 24228 (F, GH, NY); *Davidse & Brant* 32010 (CAS); *Gentle* 3979 (MICH, NY); *Gentry* 8168 (MO); *Kinloch* 33 (F); *Schipp* 1353 (K; type of *O. amicorum*).

The taxonomic disposition of *O. amicorum* was addressed by Daniel (1995c).

Pseuderanthemum verapazense Donn. Sm.

TOLEDO: *Peck* 830 (GH; type of *Eranthemum adenocarpum* S. F. Blake); *Schipp* S-462 (F), S-669 (F), S-671 (F, K, NY).

Ruellia coerulea Morong.

BELIZE: *Daniel* 8278 (CAS).—COROZAL: *Gentle* 347 (MICH).

This species was not included by Dwyer and Spellman (1981). It is often cultivated under the name *R. brittoniana* Leonard, and it may sometimes become naturalized. *Daniel* 8278 was cultivated in a garden. It is unclear from the label data on *Gentle* 347 whether the collection was cultivated or not. It is not likely that *R. coerulea* is indigenous in Belize. Gentle's collection was identified by Leonard in 1936 as *R. malacosperma* Greenm., a species described from Mexico that may be conspecific with *R. coerulea*. The distribution, taxonomy, and nomenclature of this species were discussed by Daniel (1995b).

Ruellia geminiflora Kunth.

CAYO: *Bartlett* 11814 (MICH); *Dwyer et al.* 323 (F, MO); *Lundell* 6602 (MICH, US); *Wiley* 368 (CAS).—STANN CREEK: *Schipp* 761 (MICH, MO, NY, UC).

Schipp's collection differs from more typical representatives of the species by the inconspicuous punctate glands on the calyx and by the lack of (or very inconspicuous) punctate glands on the corolla.

Ruellia harveyana Stapf (including *R. obtusata* S. F. Blake).

BELIZE: *Dwyer* 11317 (MO).—CAYO: *Bartlett* 13063 (CAS, MICH, NY, US); *Gentle* 8598 (F, MO, US); *Lundell* 322 (DS, F, UC), 6518 (DS, MICH, NY, US), 6667 (MICH, NY, US); *Spellman* 1577 (MO).—STANN CREEK: *Dwyer et al.* 569 (MO); *Gentle* 7957 (F, MO); *Schipp* 976 (F, MICH, MO, NY, UC); *Stocker* 20 (F; type of *R. longipila* Standl.).—TOLEDO: *Gentle* 7056 (LL); *Peck* 871 (GH; type of *R. obtusata*).

Ruellia hookeriana (Nees) Hemsl.

CAYO: *Casentino* 33 (F).

This species was not listed for Belize by Dwyer and Spellman (1981) but was noted to occur in the country by Daniel (1995b).

Ruellia matagalpae Lindau.

CAYO: *Balick et al.* 3346 (US); *Gentle* 2300 (MICH, NY, US); *Liesner & Dwyer* 1552 (MO); *Spellman* 1371 (MO).—TOLEDO: *Davidse & Brant* 32422 (CAS); *Gentle* 3984 (F, MICH, MO, NY).

Ruellia nudiflora (Engelm. & Gray) Urb.

CAYO: *Arvigo* 56 (US); *Arvigo* 1987-17 (F); *Balick et al.* 1797 (US); *Daniel* 8272 (CAS).—COROZAL: *Crane* 89 (CAS); *Croat* 24586 (MO); *Dwyer* 14504 (MO); *Gentle* 178 (MICH, US).—ORANGE WALK: *Arnason & Lambert* 17150 (MO); *Daniel* 7033 (CAS); *Lundell* 36 (F, MICH, US), 365 (F, MICH), 634 (DS, F, MO, NY, US).—DISTRICT UNKNOWN: *Lundell* 4979 (MICH, MO, US).

Ruellia pereducta Standl.

CAYO: *Bartlett* 12900 (CAS, MICH, US); *Chanek* 39 (MICH, US); *Dwyer et al.* 179 (MO), 376 (MO); *Gentle* 2170 (F, MICH, NY); *Lundell* 6128 (MICH, NY, US); *Molina R.* 129 (F); *Whitefoord* 2888 (MO).—TOLEDO: *Schipp* S-645 (F, NY).

Ruellia pygmaea Donn. Sm.

TOLEDO: *Schipp* S-668 (F, NY), 1351 (F, MICH, MO, NY).

Thunbergia alata Bojer ex Sims.

CAYO: *Chanek* 200 (F, MICH).

This African species is widely cultivated and naturalized in the American tropics.

Thunbergia erecta (Benth.) T. Anderson.

BELIZE: *Daniel* 8277 (CAS).—CAYO: *Balick* 2278 (US).

This African species, which was not listed by Dwyer and Spellman (1981), is cultivated in Belize and elsewhere in the New World.

Thunbergia fragrans Roxb.

TOLEDO: *Gentle* 6371 (CAS, F, MO, NY, US).

This Asian species was not reported by Dwyer and Spellman (1981). It is often cultivated and has become naturalized in various parts of the neotropics.

Thunbergia grandiflora Roxb.

BELIZE: *Whitefoord* 2453 (MO).—COROZAL: *Gentle* 50 (F); *Lundell* 4786 (MICH, NY).—STANN CREEK: *Daniel* 8289 (CAS).

This Asian species is widely cultivated and sometimes persists or becomes locally naturalized in tropical regions.

EXCLUDED TAXA AND NAMES

The following names were listed as species occurring in Belize by Dwyer and Spellman (1981) but are excluded from the list above. Their respective dispositions are noted below. For those that are now treated as synonyms of other names a reference in which the synonymy was accepted is provided.

Aphelandra repanda Nees.—Synonym of *A. aurantiaca* (Daniel 1991).

A. deppeana Schltl. & Cham.—Synonym of *A. scabra* (Daniel 1991).

Barleria micans Nees.—Synonym of *B. oenotheroides* (Daniel 1995a).

Blechum brownei Juss.—Synonym of *B. pyramidatum* (Daniel 1995a).

Bravaisia tubiflora Hemsl.—Synonym of *B. berlandieriana* (Daniel 1988).

Dicliptera assurgens (L.) Juss.—Synonym of *D. sexangularis* (Daniel 1995b).

Hygrophila guianensis Nees.—Synonym of *H. costata* (Daniel 1995b).

“*Justicia assurgens* (L.) Juss.”—This “name” represents an error in Dwyer and Spellman (1981), apparently based on mislabeled specimens at MO, for *Dicliptera assurgens* (= *D. sexangularis*).

Justicia magniflora (S. F. Blake) D. N. Gibson.—Synonym of *J. fimbriata* (Daniel 1995b).

Justicia sp.—Dwyer and Spellman (1981) listed *Croat 23899* as an undetermined species of *Justicia*. The whereabouts of this collection are not known (T. Croat, pers. comm.).

Odontonema flagellum (Oerst.) Kuntze.—Synonym of *O. tubaeforme* (Daniel 1995c).

O. glabrum Brandegee.—This species was listed by Dwyer and Spellman (1981) but was not noted as occurring in Belize by either Baum (1982) or Daniel (1995c). *Odontonema glabrum* was listed by Leonard (1936) for Belize based on *Bartlett 12947*, which here is assigned to *O. hondurensis*.

Pseuderanthemum tetrasepalum S. F. Blake.—Synonym of *Justicia breviflora* (see above).

Ruellia biolleyi Lindau.—Dwyer and Spellman (1981) included this species, known from lowland rain forests of Costa Rica and Panama, on the basis of *Dwyer 12061*. No specimens of this collection have been located, and it is unlikely that the species occurs in Belize.

Ruellia obtusata S. F. Blake.—Synonym of *R. harveyana* (Daniel 1995b).

Ruellia paniculata L.—Dwyer and Spellman (1981) included this species and cited *Kellman 511*. Although the species might be expected to occur in Belize, I have not been able to locate this collection.

“*Ruellia pilosa*.”—Dwyer and Spellman (1981) were presumably referring to *R. pilosa* (Nees) Pav. ex Hemsl. (a later homonym of *R. pilosa* L.f.), among the various taxa given this name. This species was described from Peruvian and Mexican collections; its circumscription is not well understood. Dwyer and Spellman (1981) included this species on the basis of *Dwyer 10155*. I have not been able to locate specimens of this collection.

“*Ruellia sarmentosa* Jacq.”—Dwyer and Spellman’s (1981) reference to this “name” is unclear. I find no record of such a name used by Jacquin. There is an Asian species that was described as *Ruellia sarmentosa* Nees and is, according to *Index Kewensis*, *Hemigraphis hirta* T. Anders. Dwyer and Spellman (1981) cited *Kellman 583* as representing this taxon; no specimens of this collection have been located.

Ruellia stemonacanthoides (Oerst.) Hemsl.—All specimens from Belize identified with or cited under this name are referable to *R. pereducta*; however, I have not located *Proctor 30096*, which was cited by Dwyer and Spellman (1981). It is unlikely that this species of the Pacific escarpment occurs in the Caribbean lowlands.

Stenandrium pedunculatum (Donn. Sm.) Leonard.—This species was included by Dwyer and Spellman (1981) without citation of a voucher or source. It was not noted as occurring in Belize by Gibson (1974) or Daniel (1985, 1995b).

Teliostachya alopecuroidea (Vahl) Nees.—Synonym of *Lepidagathis alopecuroidea* (Daniel 1995b).

ACKNOWLEDGMENTS

I am grateful for the assistance of M. Butterwick, D. Wasshausen, M. Grayum, B. Winning, M. Balick, the Belize Ministry of Tourism and the Environment (Department of Archaeology), and the Belize Ministry of Natural Resources (Department of Forestry). Partial financial support for field studies was provided by Oceanic Society Expeditions and the California Academy of Sciences In-house Research Fund. I thank curators of the following herbaria for making specimens available for study: A, BM, CAS, DS, DUKE, ENCB, F, G, GH, K, LL, MEXU, MICH, MO, NO, NY, RSA, TEX, UC, and US.

LITERATURE CITED

- Baum, V. M. 1982. A revision of the genus *Odontonema* (Acanthaceae). Unpublished M.Sc. Thesis, University of Maryland, College Park.
- Blake, S. F. 1917. Descriptions of new spermatophytes, chiefly from the collection of Prof. M. E. Peck in British Honduras. *Contr. Gray Herb.* 52: 59–106.
- Daniel, T. F. 1985. A revision of *Stenandrium* (Acanthaceae) in Mexico and adjacent regions. *Ann. Missouri Bot. Gard.* 71: 1028–1043.
- . 1988. A systematic study of *Bravaisia* DC. (Acanthaceae). *Proc. Calif. Acad. Sci.* 45: 111–132.

- . 1991. A revision of *Aphelandra* (Acanthaceae) in Mexico. *Proc. Calif. Acad. Sci.* 47: 235–274.
- . 1993. Taxonomic and geographic notes on Central American Acanthaceae. *Proc. Calif. Acad. Sci.* 48: 119–130.
- . 1995a. New and reconsidered Mexican Acanthaceae. VI. Chiapas. *Proc. Calif. Acad. Sci.* 48: 253–284.
- . 1995b. Acanthaceae. In *Flora of Chiapas*, by D. E. Breedlove, pt. 4: 1–158.
- . 1995c. Revision of *Odontonema* (Acanthaceae) in Mexico. *Contr. Univ. Michigan Herb.* 20: 147–171.
- Durkee, L. H. 1978. Acanthaceae. In *Flora of Panama*, ed. R. Woodson et al., *Ann. Missouri Bot. Gard.* 65: 155–284.
- . 1986. Acanthaceae. In *Flora Costaricensis*, ed. W. Burger, *Fieldiana, Bot.* 18: 1–92.
- Dwyer, J. D., and D. L. Spellman. 1981. A list of the Dicotyledoneae of Belize. *Rhodora* 83: 161–236.
- Famighetti, R., ed. 1995. *The world almanac and book of facts 1996*.
- Fosberg, F. R., D. R. Stoddart, M.-H. Sachet, and D. L. Spellman. 1982. Plants of the Belize Cays. *Atoll Res. Bull.* 258: 1–77.
- Gibson, D. N. 1974. Acanthaceae. In *Flora of Guatemala*, ed. P. C. Standley et al. *Fieldiana, Bot.* 24 (10): 328–461.
- Greuter, W. et al. 1994. International Code of Botanical Nomenclature. *Regnum Veg.* 131: 1–389.
- Hampshire, R. J. 1989. Belize. In *Floristic Inventory of Tropical Countries*, ed. D. G. Campbell and H. D. Hammond, 286–289. Bronx: New York Botanical Garden.
- Leonard, E. C. 1936. The Acanthaceae of the Yucatan Peninsula. *Publ. Carnegie Inst. Wash.* 461: 191–238.
- Lindley, J. 1845. *Aphelandra aurantiaca*. *Bot. Reg.* 31: no. 12.
- Lundell, C. L. 1945. The vegetation and natural resources of British Honduras. In *Plants and plant science in Latin America*, ed. F. Verdoorn, 270–273.
- Scheidweiler, M. 1842. Notice sur quelques nouveaux genres et espèces de plantes. *Bull. Acad. Roy. Sci. Bruxelles* 9: 19–26.
- Spellman, D. L., J. D. Dwyer, and G. Davidse. 1975. A list of the Monocotyledoneae of Belize including a historical introduction to plant collecting in Belize. *Rhodora* 77: 105–140.
- Standley, P. C., et al. 1958–1977. *Flora of Guatemala*. *Fieldiana, Bot.* 24.
- Wasshausen, D. C. 1975. The genus *Aphelandra* (Acanthaceae). *Smithsonian Contr. Bot.* 18: 1–157.
- Wendt, T. 1993. Composition, floristic affinities, and origins of the canopy tree flora of the Mexican Atlantic slope rain forests. In *Biological diversity of Mexico: origins and distribution*, ed. T. P. Ramamoorthy et al., 595–680.
- Williams, L. O. 1981. The useful plants of Central America. *Ceiba* 24: 1–381.

APPENDIX

OVERALL DISTRIBUTION PATTERNS OF ACANTHACEAE NATIVE TO BELIZE

Widespread (62.5%): *Aphelandra aurantiaca*, *A. scabra*; *Barleria oenotheroides*; *Blechum pyramidatum*; *Bravaisia berlandieriana*; *Dicliptera inutilis*, *D. sexangularis*, *D. sumichrastii*; *Elytraria imbricata*; *Hygrophila costata*; *Justicia aurea*, *J. breviflora*, *J. candelariae*, *J. comata*, *J. pectoralis*, *J. spicigera*; *Lepidagathis alopecuroidea*; *Mendoncia lindavii*, *M. retusa*; *Odontonema callistachyum*, *O. tubaeforme*; *Ruellia geminiflora*, *R. hookeriana*, *R. matagalpae*, *R. nudiflora*.

Regional (30%): *Bravaisia grandiflora*; *Carlowrightia myriantha*; *Justicia albobracteata*, *J. bartlettii*, *J. campechiana*, *J. fimbriata*; *Louteridium donnell-smithii*; *Odontonema albiflorum*, *O. hondurensis*; *Pseuderanthemum verapazense*; *Ruellia harveyana*, *R. pereducta*.

Local (5%): *Justicia ensiflora*; *Ruellia pygmaea*.

Endemic (2.5%): *Louteridium chartaceum*.